

WHAT IS CLAIMED IS:

1. A resist pattern thickening material comprising:
  - a resin;
  - a crosslinking agent; and
  - at least one of a cationic surfactant, an amphoteric surfactant, and a non-ionic surfactant selected from an alkoxyate surfactant, a fatty acid ester surfactant, an amide surfactant, an alcohol surfactant, and an ethylene diamine surfactant.
2. A resist pattern thickening material according to Claim 1, wherein the cationic surfactant is at least one of an alkyl cationic surfactant, an amide quaternary cationic surfactant, and an ester quaternary cationic surfactant.
3. A resist pattern thickening material according to Claim 1, wherein the amphoteric surfactant is at least one of an aminoxide surfactant and a betaine surfactant.
4. A resist pattern thickening material according to Claim 1, wherein the alkoxyate surfactant is at least one of a nonylphenol ethoxylate surfactant, an octylphenol ethoxylate surfactant, a lauryl alcohol ethoxylate surfactant, an oleyl alcohol ethoxylate surfactant, and a secondary alcohol ethoxylate surfactant.

5. A resist pattern thickening material according to Claim 1, wherein the resist pattern thickening material has at least one of water-solubility and alkali-solubility.
6. A resist pattern thickening material according to Claim 1, wherein the resin is at least one of polyvinyl alcohol, polyvinyl acetal, and polyvinyl acetate.
7. A resist pattern thickening material according to Claim 1, wherein the resin contains polyvinyl acetal in an amount of 5% by mass to 40% by mass.
8. A resist pattern thickening material according to Claim 1, wherein the crosslinking agent is at least one of a melamine derivative, a urea derivative, and an uril derivative.
9. A resist pattern thickening material according to Claim 1, further comprising a water-soluble aromatic compound.
10. A resist pattern thickening material according to Claim 9, wherein a solubility of the water-soluble aromatic compound is 1 g or more thereof in 100 g of water of 25°C.
11. A resist pattern thickening material according to Claim 9, wherein the water-soluble aromatic compound has at least two polar

groups.

12. A resist pattern thickening material according to Claim 11, wherein the polar groups are each independently selected from hydroxyl groups, carboxyl groups, and carbonyl groups.

13. A resist pattern thickening material according to Claim 9, wherein the water-soluble aromatic compound is at least one of a polyphenol compound, an aromatic carboxylic acid compound, a naphthalene polyhydroxy compound, a benzophenone compound, a flavonoid compound, a derivative thereof, and a glycoside thereof.

14. A resist pattern thickening material according to Claim 1, further comprising a resin containing an aromatic compound in a portion thereof.

15. A resist pattern thickening material according to Claim 14, wherein the resin containing an aromatic compound in a portion thereof is at least one of a polyvinyl aryl acetal resin, a polyvinyl aryl ether resin, and a polyvinyl aryl ester resin.

16. A resist pattern thickening material according to Claim 14, wherein the aromatic compound in the resin containing an aromatic compound in a portion thereof has at least one functional group of a hydroxyl group, an amino group, a sulfonyl group, a carboxyl group,

and a derivative thereof.

17. A resist pattern thickening material according to Claim 14, wherein the resin containing an aromatic compound in a portion thereof has an acetyl group.

18. A resist pattern thickening material according to Claim 14, wherein a molar content of the aromatic compound in the resin containing an aromatic compound in a portion thereof is 5 mol% or more.

19. A resist pattern thickening material according to Claim 1, further comprising an organic solvent.

20. A resist pattern thickening material according to Claim 19, wherein the organic solvent is at least one of an alcohol solvent, a chain ester solvent, a cyclic ester solvent, a ketone solvent, a chain ether solvent, and a cyclic ether solvent.

21. A resist pattern comprising:

a resist pattern thickening material to cover a surface of a resist pattern to be thickened so as to thicken the resist pattern to be thickened,

wherein the resist pattern thickening material is applied onto the resist pattern to be thickened after forming the resist pattern to be

thickened, and the resist pattern thickening material comprises:

a resin;

a crosslinking agent; and

at least one of a cationic surfactant, an amphoteric surfactant, and a non-ionic surfactant selected from an alkoxylate surfactant, a fatty acid ester surfactant, an amide surfactant, an alcohol surfactant, and an ethylene diamine surfactant.

22. A resist pattern according to Claim 21, wherein a material of the resist pattern is at least one of a novolak resist, a polyhydroxystyrene (PHS) resist, an acrylic resist, a cycloolefin - maleic acid anhydride resist, a cycloolefin resist, and a cycloolefin - acryl hybrid resist.

23. A process for forming a resist pattern, comprising:

applying a resist pattern thickening material onto a resist pattern to be thickened, to cover a surface of the resist pattern to be thickened, after forming the resist pattern to be thickened, so as to thicken the resist pattern to be thickened,

wherein the resist pattern thickening material comprises:

a resin;

a crosslinking agent; and

at least one of a cationic surfactant, an amphoteric surfactant, and a non-ionic surfactant selected from an alkoxylate surfactant, a fatty acid ester surfactant, an amide surfactant, an alcohol surfactant, and an ethylene diamine surfactant.

24. A process for forming a resist pattern according to Claim 23, wherein a developing process is carried out after the step of applying the resist pattern thickening material.
25. A process for forming a resist pattern according to Claim 24, wherein the developing process is carried out by using pure water.
26. A semiconductor device comprising:  
a pattern formed by using a resist pattern thickened by a resist pattern thickening material,  
wherein the resist pattern thickening material comprises:  
a resin;  
a crosslinking agent; and  
at least one of a cationic surfactant, an amphoteric surfactant, and a non-ionic surfactant selected from an alkoxylate surfactant, a fatty acid ester surfactant, an amide surfactant, an alcohol surfactant, and an ethylene diamine surfactant.
27. A process for manufacturing a semiconductor device comprising:  
applying a resist pattern thickening material to cover a surface of a resist pattern to be thickened, after forming the resist pattern to be thickened on an underlying layer, so as to thicken the resist pattern to be thickened and form a resist pattern; and  
etching the underlying layer using the resist pattern as a

mask so as to pattern the underlying layer,

wherein the resist pattern thickening material comprises:

a resin;

a crosslinking agent; and

at least one of a cationic surfactant, an amphoteric surfactant, and a non-ionic surfactant selected from an alkoxylate surfactant, a fatty acid ester surfactant, an amide surfactant, an alcohol surfactant, and an ethylene diamine surfactant.

28. A process for manufacturing a semiconductor device according to Claim 27, further comprising:

applying a surfactant on the surface of the resist pattern to be thickened, before the step of applying the resist pattern thickening material.